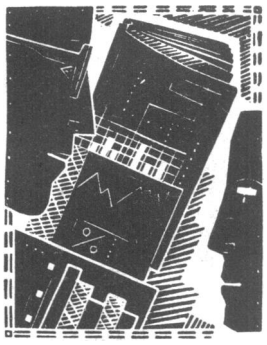
AUDIT IN PRACTICE



THIS WEEK . . .

- *In the first article, at a time when many departments are installing computer systems to collect data, Yudkin and Redman report the use of more than five years' obstetric audit data in the Oxford Obstetric Data System. Genuine clinical audit comparing practice with defined standards was rare. They emphasise that, though routinely collected computerised data make ongoing clinical audit possible, its realisation depends on clinicians' attitudes; even then the data may be inadequate for detailed audits.*

- *The commissioned article by Schoenbaum and Gottlieb illustrates the contribution of clinical decision making based on algorithms to improved quality of care.*

Obstetric audit using routinely collected computerised data

P L Yudkin, C W G Redman

Abstract

***Objective*—To examine the use of routinely collected computerised data in clinical audit.**

***Design*—Retrospective review of all analyses of obstetric practice based on a computerised data system from January 1983 to June 1988.**

***Setting*—Maternity department of the regional referral hospital in Oxford.**

***Main outcome measures*—Congruence with the principles of clinical audit; that is, comparing clinical practice with previously agreed standards and changing practice to meet these standards if necessary.**

***Results*—Over the five and a half years of the study the data formed the basis of 130 special inquiries into different aspects of obstetric practice. Most inquiries seemed to be aimed only at describing current activities and identifying trends. Genuine clinical audit was rare. Simple audits—for example, concerning induction for pregnancy after term—could be supported by the computerised data, but for detailed and wide ranging audits—for example, reducing antenatal clinic visits for low risk multiparas—the data had to be supplemented from other sources.**

***Conclusions*—Routinely collected computerised data enable ongoing clinical audit, but it becomes a reality only when clinicians agree on standards of practice and have a flexible attitude towards change. Even then, genuine clinical audits of obstetric practice demand more detailed and comprehensive data than are generally available on such systems.**

Introduction

There is a general view that audit in obstetrics is nothing new. Infant and maternal mortalities in England and Wales have been reported for more than a century,[1] and many departments of obstetrics and gynaecology already issue their own reports of each year's activities. Clinical audit, however, is more than the mere enumeration of clinical activities and outcomes.[2-4] It must involve a critical element[2] of setting standards as well as an intention to change practice if the standards are not being met. Genuine clinical audit therefore implies a flexible attitude towards change and a mechanism for implementing it.

In this hospital detailed obstetric data have been recorded routinely since 1978 on the computerised Oxford Obstetric Data System. The system was set up at a time when the potential of computers in clinical practice was only beginning to be realised, and ways of exploiting the data have gradually been developed.

Recently the system has been used extensively for monitoring clinical activities, with regular reports and ad hoc investigations into particular aspects of obstetric practice. This paper describes these activities over five and a half years and uses them to investigate the role of computerised data in clinical audit.

Methods

We investigated analyses carried out from January 1983 to June 1988.

Information recorded by the obstetric data system

All women delivering in the hospital are included in the system. Each record contains clinical information relating to the entire pregnancy, from the first antenatal visit to the final discharge. The data set, which includes some 250 items of information for each woman, is similar to that recommended by the Körner report[5] but in several respects is more detailed, including indications for procedures and interventions, all maternal diseases and complications of pregnancy (whether or not they entailed hospital admission), and some maternal characteristics and procedures not included in the Körner data. Drugs given to the mother during pregnancy and delivery and to the newborn baby are also recorded. Data are available from 1978 onwards.

Data collection, validation, and access

Information is taken from the case notes after discharge and is recorded on structured coding sheets by a team of trained coding clerks. The clerks maintain close contact with a senior clinician (CWGR) in case any coding queries arise. Data are entered weekly into the regional computer (ICL 2966). (This system will be replaced in late 1990 by immediate data entry from computer terminals sited around the hospital, with the current year's data held on minicomputer.) The data pass through stringent and comprehensive computer checks, and errors are immediately corrected. Accuracy was originally established by comparison with manual records and is maintained by frequent use of the data, particularly by using the system to identify mothers or babies with certain characteristics or diagnoses so that their case notes may be inspected. Access to the data is through a computer package written by staff of the regional computer unit, which allows any of the data items to be cross tabulated or averaged with respect to any other item; programs run overnight.

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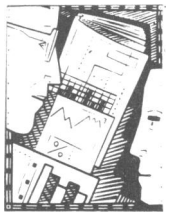

Cost

Coding from the medical notes requires the equivalent of 5·5 whole time clerks, at about £47 000 annual cost (including "on costs"). An additional £1000 is spent on stationery. Annual costs associated with the mainframe computer (for preparing data and for computer operations) are £18 500. These running costs will be substantially reduced when the present obsolescent system is replaced. We have also identified a need for a well qualified system and data manager, at an annual cost of about £16 000.

Results

Analyses during the five and a half years of the study fell into two groups: regular reports of clinical activities and special investigations initiated by doctors, nurses, administrators, and researchers, ranging from straightforward inquiries (for instance, the proportion of mothers who smoked) to sustained research projects leading to publications.[6-13] In all, about 130 different investigations were made. All analyses were handled by one of us (PY), who was not always aware of the final use made of the data. Most of these analyses, however, seemed to be exploratory, with the aim of describing methods of clinical management, characteristics of the women and babies cared for, and medical outcomes. We could identify very few inquiries fulfilling the requirements of clinical audit.[3] We chose three examples to illustrate the ways in which the data were used.

EXAMPLE 1—MANAGEMENT OF THE SECOND STAGE OF LABOUR

In this example, which is also the most typical, the data were used to describe one aspect of clinical management with no aim other than to discover trends. Between 1981 and 1984 the length of the second stage of labour, particularly among primiparas showed some striking changes (table I)[7]. The results were presented to the obstetric department, but they did not lead to any discussion or action about management.

EXAMPLE 2—INVESTIGATION OF INDUCTION FOR PREGNANCY AFTER TERM

This example is of clinical audit of one aspect of obstetric management based entirely on data from the system. A consultant set a protocol for induction after term, which included a recommendation not to induce labour before two weeks after term. As the protocol was more stringent than those of the other consultants he expected the rate of induction in his patients to be the lowest. However, an annual report comparing the performance of the six consultant teams showed that his rate for the previous year, at 24·2%, was no lower than that achieved by three other consultants. Suspecting that the protocol was not being followed, he used the data to examine the indications for induction of his patients by gestation and parity (table II, year 1). Uncomplicated pregnancy after term was the indication for induction in 43 of 386 (11·1%) primiparas and 29 of 238 (12·2%) multiparas, accounting for almost half of all inductions performed. The consultant then initiated discussions with his clinical staff, which led to a decision to adhere more firmly to the recommended protocol. In the subsequent year induction for pregnancy after term fell in primiparas to 27 of 328 (8·2%) and more sharply in multiparas, to 18 of 295 (6·1%). The total rate fell from 24·2% to 18·3%. A slight drop in inductions for indications other than pregnancy after term was also observed.

TABLE I—*Management of labour, primiparas, 1981-4. Figures are numbers (percentages)*

	1981 (n=2242)	1982 (n=2046)	1983 (n=2077)	1984 (n=2102)
Epidural anaesthesia	45·4	42·0	38·4	38·5
Second stage >120 min	7·2	7·2	12·5	14·9
Spontaneous delivery	66·7	70·9	73·8	75·0
Episiotomy	69·7	58·6	49·9	44·7

TABLE II—*Indications for induction by parity for one consultant*

	Year 1	Year 2
Total rate of induction (%)	24·2	18·3
No of primiparas	386	328
No (%) induced	97 (25·1)	69 (21·0)
For pregnancy after term	43 (11·1)	27 (8·2)
For pregnancy after term (<42 weeks)	20 (5·2)	13 (4·0)
For other reasons	54 (14·0)	42 (12·8)
No of multiparas	238	295
No (%) induced	54 (22·7)	45 (15·3)
For pregnancy after term	29 (12·2)	18 (6·1)
For pregnancy after term (<42 weeks)	21 (8·8)	8 (2·7)
For other reasons	25 (10·5)	27 (9·2)

EXAMPLE 3—REDUCING CLINIC VISITS FOR LOW RISK MULTIPARAS

This example illustrates a more detailed clinical audit, involving both clinical management and the resulting outcome, whose analysis required external data for its completion. Concern that hospital antenatal clinics were overcrowded, slow, and inconvenient for mothers prompted a suggestion that attendance at them might be reduced for low risk multiparas. Instead of a booking visit and two or three further visits in the third trimester (with the remaining care being given in the community) women would attend for booking and then not again until 41 weeks. Three of the six consultants adopted the new policy. The results were monitored by comparing the management and outcome of pregnancy in women booking before and after the change, with the women in the care of the three consultants who maintained the same policy throughout as the control group.

The impact of the policy change could not be assessed using data from the system alone. Though the number of antenatal visits made to the hospital clinic was recorded in the system, the time spent in the clinic was not, nor was there any record of the number of antenatal visits made to the general practitioner. These items were therefore obtained from questionnaires completed by the mothers; at the same time the mothers were asked how satisfied they were with their antenatal care.

The number of visits to the hospital clinic was much reduced, with the proportion of low risk multiparas attending only once or twice increasing from 20% to 58%, but this had no impact on clinic waiting times. Total antenatal attendances, including those made to general practitioners, were unchanged. More mothers were satisfied with their antenatal care with the new policy than with the old.

A check was made to ensure that the detection of complications (such as breech presentation, intrauterine growth retardation, and pre-eclampsia) was not delayed by the reduction in visits to the hospital clinic. Details of the timing and circumstances surrounding the detection of these complications were not held in the system and had to be obtained from the medical notes. No adverse effects of the changed policy were found.

Discussion

Clinical audit can become a reality only when clinicians are prepared to consider changing their practice if their agreed standards are not being met. During the period we describe, many inquiries were made of the Oxford Obstetric Data System. Most were apparently intended only to describe the current practice or to detect trends. Some of the information

produced—for instance, that concerning standards for birth weight and head circumference[9,10] or the risk of unexplained stillbirth[11]—was clearly relevant to clinical practice, and possibly it had some indirect influence on management. But most commonly we observed that even striking and unexpected results, such as the increase in the length of the second stage of labour occurring between 1981 and 1984 (table I) caused little stir and no action.

One reason for this may be the traditional emphasis placed on the perinatal mortality rate as the key indicator of obstetric outcome. During the 1980s the hospital's perinatal mortality rate fell fairly steadily from 8·6 per 1000 births in 1980 to 6·1 per 1000 in 1988. Such results may seem to vindicate current obstetric management so that there is little incentive to draw up further standards of practice. Such a conclusion is unjustified, however, not least because obstetric care can make little impact on a perinatal mortality rate that is already at such a low level. Congenital malformations now account for something like a fifth of perinatal deaths, and a further half have no known obstetric antecedent.[14] Moreover, concentration on perinatal mortality alone neglects many aspects of obstetric care that should be examined, such as screening for neural tube defects, managing pre-eclampsia, the use of caesarean section, and the incidence of neonatal convulsions in mature infants.

Also in the period we considered, which ended in 1988, there was relatively little awareness of the importance of audit; the Department of Health's working paper on medical audit[2] appeared in 1989.

If clinicians do start to perform more clinical audit, will computerised data systems ease their task? Firstly, a computerised system can be used for clinical audit only if it incorporates a flexible method of analysing its data. Systems geared simply to producing regular reports specified in advance would thus be useless. Our experience further suggests that computerised data may be sufficient for a limited audit exercise but are inadequate both in coverage and detail for a thorough appraisal of clinical management and outcome. For instance, induction of labour for pregnancy after term is a topic that has been evaluated in several randomised controlled trials.[15] The audit we described concentrated on the process of induction rather than on pregnancy outcome, the only data analysed being the indications for induction in relation to parity and gestation. This information was available from the Oxford Obstetric Data System, although it would be excluded from many computer systems, particularly as it is not included in the Körner recommendations.[5] Such information might be collected as a special item on most modern computer systems, which have space for research data. But this would mean setting up each audit as a special research project, which would involve delay, and the potential for constant surveillance that arises from ongoing data collection would be lost.

Attendance at antenatal clinics has not been well evaluated elsewhere. Detailed information about both the process and outcome of antenatal care was therefore sought. Data from the Oxford system proved inadequate and had to be supplemented by questionnaire as well as by data gathered from the medical notes. The adequacy of routinely collected data depends on the type of audit, but the more thorough, comprehensive and penetrating the audit the more likely is the need to collect additional data.

The costs of a computerised data system are not trivial. The Oxford equipment is now obsolete, so that costs are greater than those of an equivalent modern system, but we have reckoned the annual costs at around £66 500. Technical and clinical progress and the periodic revisions of standard coding systems (such as the International Classification of Diseases) mean that a system must be regularly revised, adding further to its cost. (The Oxford system has now been written three times.) Also, we believe that the effort and perseverance needed to maintain an accurate, up to date, and comprehensive data system are not generally appreciated. Such systems seem to have a limited use in clinical audit; their further justification must be sought elsewhere.

We thank the coding team for their diligent and expert work, and Professor David Barlow and Dr Alison Hill for permission to describe their analyses.

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THE MEMOIR CLUB

I remember a very special lecture on shock. It was an Arris and Gale lecture at the Royal College of Surgeons in London. It had the usual small attendance and was given by the senior surgeon at St Mary's Hospital. He described a case in great detail, saying he had finished his morning work at the hospital and had just walked down the steps, flanked by his house surgeon and registrar. The registrar was about to open the back door of his car, when the house surgeon would neatly put the rug over his knees. Just then on the footpath a middle-aged man suddenly collapsed in front of them. They bent down and they heard him say, "The doctors always told me my b— ulcer would burst some time." In fact they were witnessing a perforated duodenal ulcer in its very earliest stages. No one could have seen it sooner. It must be operated on at once before there was much peritoneal soiling. They got a porter, a stretcher, a trolley, the man was admitted, a quick premedication, a quick short back and sides to the pubic region, and the patient was on the table in 15 minutes. The operation went very well and the patient died. He was already shocked and they had given him no time for this to be dealt with before inflicting another insult. It was a dramatic case and well told, and certainly accentuated a very important principle. I repeated this story over and over again for 10 years or so, telling my students about it every time we had a perforated ulcer in the ward. Finally one day I ran into Zachary Cope and said I must thank him as I had used his story so often and with such success.

"Yes," he said, "it was a good story; of course you know it never did happen, I made it up the night before."

I really was shaken. I did not know whether to laugh or be annoyed with myself or him.